

What is claimed is:

1. An isolated peptide exhibiting lipid acyl hydrolase activity and corn rootworm insect inhibitory bioactivity comprising the amino acid sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:21, SEQ ID NO:23, SEQ ID NO:25, SEQ ID NO:27, SEQ ID NO:29, SEQ ID NO:31, SEQ ID NO:33, SEQ ID NO:35, SEQ ID NO:36, SEQ ID NO:40, and SEQ ID NO:41.
- 10 2. The peptide according to claim 1 further comprising amino acid sequence motifs comprising
 - a) a first motif comprising Gly-Xaa₁-Ser-Xaa₂-Gly as set forth in SEQ ID NO:14, wherein Xaa₁ and Xaa₂ are Ser or Thr;
 - b) a second motif comprising Glu-Xaa₁-Xaa₂-Leu-Val-Asp-Gly as set forth in SEQ ID NO:15, wherein Xaa₁ comprises the amino acids selected from the group consisting of Tyr, Phe, and Trp, and wherein Xaa₂ comprises the amino acids selected from the group consisting of His and Asn; and
 - c) a third motif comprising Phe-Tyr-Xaa₁-Glu-Xaa₂-Gly-Pro as set forth in SEQ ID NO:42, wherein Xaa₁ comprises the amino acids selected from the group consisting of Phe, Ile, and Leu, and wherein Xaa₂ comprises the amino acids selected from the group consisting of His and Asn.
- 25 3. The peptide according to claim 2 wherein the substitution of
 - a) Ser in said first motif for any other amino acid;
 - b) Asp in said second motif for any other amino acid; or
 - c) Xaa₂ in said third motif for any amino acid other than His or Asneliminates the lipid acyl hydrolase activity and insect bioactivity of said peptide.
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4. The peptide of claim 1, wherein said peptide is not naturally occurring.
5. The peptide of claim 2, wherein said peptide is not naturally occurring.
- 5 6. A method for selecting an isolated protein exhibiting lipid acyl hydrolase activity and corn rootworm insect inhibitory bioactivity comprising the steps of
 - a) identifying the amino acid sequence of said protein;
 - b) identifying in said sequence the presence of
 - i) a first motif comprising Gly-Xaa₁-Ser-Xaa₂-Gly as set forth in SEQ ID NO:14, wherein Xaa₁ and Xaa₂ are Ser or Thr;
 - 10 ii) a second motif comprising Glu-Xaa₁-Xaa₂-Leu-Val-Asp-Gly as set forth in SEQ ID NO:15, wherein Xaa₁ comprises the amino acids selected from the group consisting of Tyr, Phe, and Trp, and wherein Xaa₂ comprises the amino acids selected from the group consisting of His and Asn; and
 - 15 iii) a third motif comprising Phe-Tyr-Xaa₁-Glu-Xaa₂-Gly-Pro as set forth in SEQ ID NO:42, wherein Xaa₁ comprises the amino acids selected from the group consisting of Phe, Ile, and Leu, and wherein Xaa₂ comprises the amino acids selected from the group consisting of His and Asn;
 - c) identifying a lipid acyl hydrolase activity; and
 - d) identifying a corn rootworm insect inhibitory bioactivity.
 7. The method of claim 6, wherein said protein is not naturally occurring.
 - 25 8. A method for protecting a plant from Coleopteran insect infestation comprising providing to said plant a Coleopteran insect inhibitory amount of a protein exhibiting lipid acyl hydrolase activity, wherein said protein comprises
 - a) a first motif comprising Gly-Xaa₁-Ser-Xaa₂-Gly as set forth in SEQ ID NO:14, wherein Xaa₁ and Xaa₂ are Ser or Thr;
 - 30 b) a second motif comprising Glu-Xaa₁-Xaa₂-Leu-Val-Asp-Gly as set forth in SEQ ID NO:15, wherein Xaa₁ comprises the amino acids selected from the

- group consisting of Tyr, Phe, and Trp, and wherein Xaa₂ comprises the amino acids selected from the group consisting of His and Asn; and
- 5 c) a third motif comprising Phe-Tyr-Xaa₁-Glu-Xaa₂-Gly-Pro as set forth in SEQ ID NO:42, wherein Xaa₁ comprises the amino acids selected from the group consisting of Phe, Ile, and Leu, and wherein Xaa₂ comprises the amino acids selected from the group consisting of His and Asn.
9. The method according to claim 8 wherein said protein is selected from the group consisting of SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID
10 NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:9, SEQ ID NO:10, SEQ ID
 NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:21, SEQ ID NO:23,
 SEQ ID NO:25, SEQ ID NO:27, SEQ ID NO:29, SEQ ID NO:31, SEQ ID
 NO:33, SEQ ID NO:35, SEQ ID NO:36, SEQ ID NO:40, and SEQ ID NO:41.
- 15 10. The method according to claim 8 wherein said protein is not naturally occurring.
11. An isolated and purified nucleic acid sequence encoding a lipid acyl hydrolase comprising the nucleic acid sequence selected from the group consisting of SEQ ID NO:20, SEQ ID NO:22, SEQ ID NO:24, SEQ ID NO:26, SEQ ID
20 NO:28, SEQ ID NO:30, SEQ ID NO:32, SEQ ID NO:34, SEQ ID NO:36,
 SEQ ID NO:37, and SEQ ID NO:38.
12. A method of transforming a plant cell to express a protein exhibiting a lipid acyl hydrolase activity and a corn rootworm inhibitory bioactivity comprising the steps of
25 a) introducing into the DNA of a plant cell a polynucleotide sequence comprising a selectable marker and the following elements linked sequentially: a plant functional promoter operably linked to a sequence encoding said protein, which is operably linked to a plant functional 3' transcription termination and polyadenylation sequence;
- 30 b) growing said plant cell in selective media to identify stably transformed plant cells; and

c) selecting a plant cell expressing said protein;
wherein said protein expressed in said plant cell is selected from the group
consisting of SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID
NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:9, SEQ ID NO:10,
SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:21, SEQ
ID NO:23, SEQ ID NO:25, SEQ ID NO:27, SEQ ID NO:29, SEQ ID
NO:31, SEQ ID NO:33, SEQ ID NO:35, SEQ ID NO:36, SEQ ID
NO:40, and SEQ ID NO:41.